

# ESMO Project Results: Minimising Federation Costs for Boosting Service and Data Convergence

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## 1. INTRODUCTION

The ESMO project, which is an acronym for *eIDAS-enabled Student Mobility*, is an EC co-funded project that finished this year. The goal of the project was to promote the adoption of the eIDAS support infrastructure of CEF eID building block. To this end and based on the experience and learning obtained in former projects, the project was designed to produce and deploy the ESMO Gateway, a tool able to be deployed in many interoperability scenarios in order to minimise customisation needs of the existing services and data sources, especially those already available for identity federations like eIDAS or EduGAIN, on the academic sector.

ESMO also aimed at using the designed Gateway capabilities to deploy a support trust network infrastructure to provide added value to the eIDAS network, by facilitating the access and aggregation of academic sector data. This way, the benefits from eIDAS and the higher education sources, like EduGAIN, can be brought together paving the path for future convergence and strategic alignment of the different stakeholders.

In the present communication we will analyse the achievements of the ESMO project during its execution, as well as the roadmap for sustainability and adoption of the Gateway and the network, which includes forming an open source community and seeking the support of academic sector reference institutions.

## 2. PROJECT GOALS

ESMO aims at deploying a network support infrastructure to facilitate the interoperability between services and data sources to minimise adoption and maintenance cost. Thus, building a platform to facilitate trust management and bringing the e-services closer to the students. Through offering cross-border technical solutions to guarantee, under the umbrella of eIDAS, the mission of ESMO is to deploy a secure and interoperable platform for student mobility across Europe and developing a new way to transfer combined citizen and academic data among universities to help minimise bureaucracy and administrative procedures.

The main goal of ESMO is to promote eIDAS adoption through the CEF eID building block. Also, being an academic community oriented initiative; the focus is to facilitate learning mobility. The Gateway and the network can help simplifying the management of trust and data requirements, promoting the digitalisation of services and acting as a single point of entry for user-driven data collection, which also facilitates overcoming data protection issues in general purpose processes.

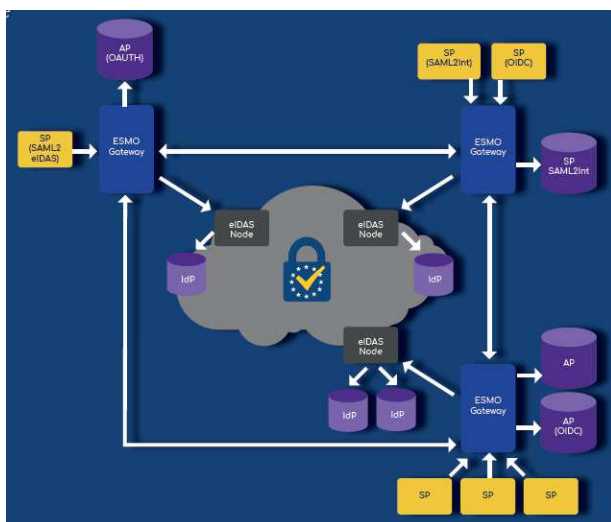
Finally, and given its general purpose design, ESMO aims at becoming a key element in promoting convergence with other initiatives in the same field, like EduGAIN and other CEF and ERASMUS+ projects with common and complementary objectives.

Despite being designed for the education sector, we expect the results of ESMO to be easily portable to other sectors.

### 3. GATEWAY DESIGN AND NETWORK

The ESMO gateway has been designed following a series of guiding principles:

- **Abstraction:** the main advantage of the Gateway is that it hides all technical and topological complexities for the integration of both service and data providers: they don't need to know what's behind them, and what are the protocols needed to reach them. The Gateway will take care of that by acting as a proxy, and using its multiple protocol support, with the capability to translate among them. This way, a data source or service provider just needs to implement one protocol and trust one entry point.
- **Scalability:** ESMO aims at being able to serve high availability deployments with the minimum cost and the maximum stability. To this end ESMO Gateway has been designed following a micro-service architecture. Each module is stateless and deployed independently. It gets connected to the system through two central elements: the Session Manager micro-service, that holds all the system state, and the Configuration Manager micro-service, which serves as the discovery service and trust broker. Multiple instances of all micro-services can be deployed to cover the demand (including the Session Manager, that includes a shared state framework).
- **Modularity and extensibility:** the behaviour of the gateway is easy to customise for situations different from its original purpose. During its design, all the functionally minimal units and their interactions were identified, creating a set of modular functional elements and the interfaces between them. This way, new modules or customisations of existing ones do not have impact on the rest of the application and limit the knowledge required to extend the functionality. Also, thanks to the micro-service approach, multiple technologies can be used to develop the modules.
- **Flexibility:** the design and behaviour of the Gateway needs to be general enough to allow deploying in a wide array of topologies, adapted to the needs of the sector, country or region. This is again achieved by the proxy functionality and the modular design.
- Security is one of the most important aspects of ESMO, carefully integrated by design to guarantee the integrity of internal and external communicational flows. Multiple layers of security have been included in ESMO architecture to offer the highest security standards in our final solution.



ork topology

To cover the infrastructure needs of the project, ESMO deployed a network of Gateways, open per country, operated by the partners. These act as a wrapper for eIDAS network, managing the different academic data sources and acting as proxies for services accessing eIDAS, providing authentication but with a response enriched with additional academic information taken from the data sources selected by the user.

To ensure sustainability of the project, ESMO plans to build an open source community around the Gateway development, started by the participating partners, and seeking the adoption by country specific and European reference entities in the field, like research networks.

### 4. REFERENCES

ESMO website (2018). *ESMO project*. Retrieved February 03, 2019, from: <http://www.esmo-project.eu/>

## 5. AUTHORS' BIOGRAPHIES

**José Pascual Gumbau Mezquita** is Head of the Office for Innovation and IT Auditing at Universitat Jaume I in Castellón (UJI), director of the corporate Systems Plan and coordinator of the IT Innovation Laboratory (Teclab). He is as well coordinator of the IT/IS Analysis, Planning and Governance Subgroup at the Spanish Rectors Conference ICT group (CRUE-TIC) and member of the GTI4U Research Team on Planning and Governance of the Information Technologies. From 2006 to 2017 he was director of the Technology Planning and Forecast Office and head officer of the STORK and STORK 2.0 e-academia pilots. He is currently leading the participation in several CEF projects, partnered with the Spanish Ministry of Public Affairs, CRUE, and other Academic and private sector partners.

Graduated with a Master's Degree in Mathematics (majoring in Computation Sciences) and Certified Information Systems Auditor (CISA) by ISACA, has a profound knowledge of ISO 38500 norm and COBIT, ITIL, ISO 20000, ISO 27000, ISO 9000 and EFQM standards. He has also worked as a professor at the Computer Science and Engineering Department at Universitat Jaume I and as a consultant for several companies in the fields of Technology Innovation and Applied Mathematics. He is also a frequent lecturer at graduate school master courses, expert courses and conferences.

**Francisco José Aragón Monzonís** graduated with a Master's Degree in Computer Engineering at Universitat Jaume I in Castellón, Spain, in 2008. Since then, he has developed a career as a programmer and analyst, both as a freelance and for the same university, in computer security and cryptography related projects. Participated in the final steps of STORK project as a programmer, but in STORK 2.0, took a more leading role in the eAcademia pilot, both in executive and technical aspects. Has an active collaboration with the Spanish NREN, RedIRIS, where he designed and operated a platform to facilitate the connection of public universities services to the national central authentication system, Cl@ve, and its interaction with eIDAS.

**José Traver Ardura** holds a Bachelor of Computer Science and a Master of Intelligent Systems degree from Universitat Jaume I de Castelló, Spain. He has been working in different IT-related departments at Universitat Jaume I in Castellón since 2002, coordinating and managing the corporate research computing clusters, designing and managing different cloud migration solutions for on-premise infrastructure and supervising compliance with personal data protection and security-related national laws and regulations. He is also part-time lecturer at UJI's seniors education program with different publications on new ways to improve seniors education using emerging IT services.